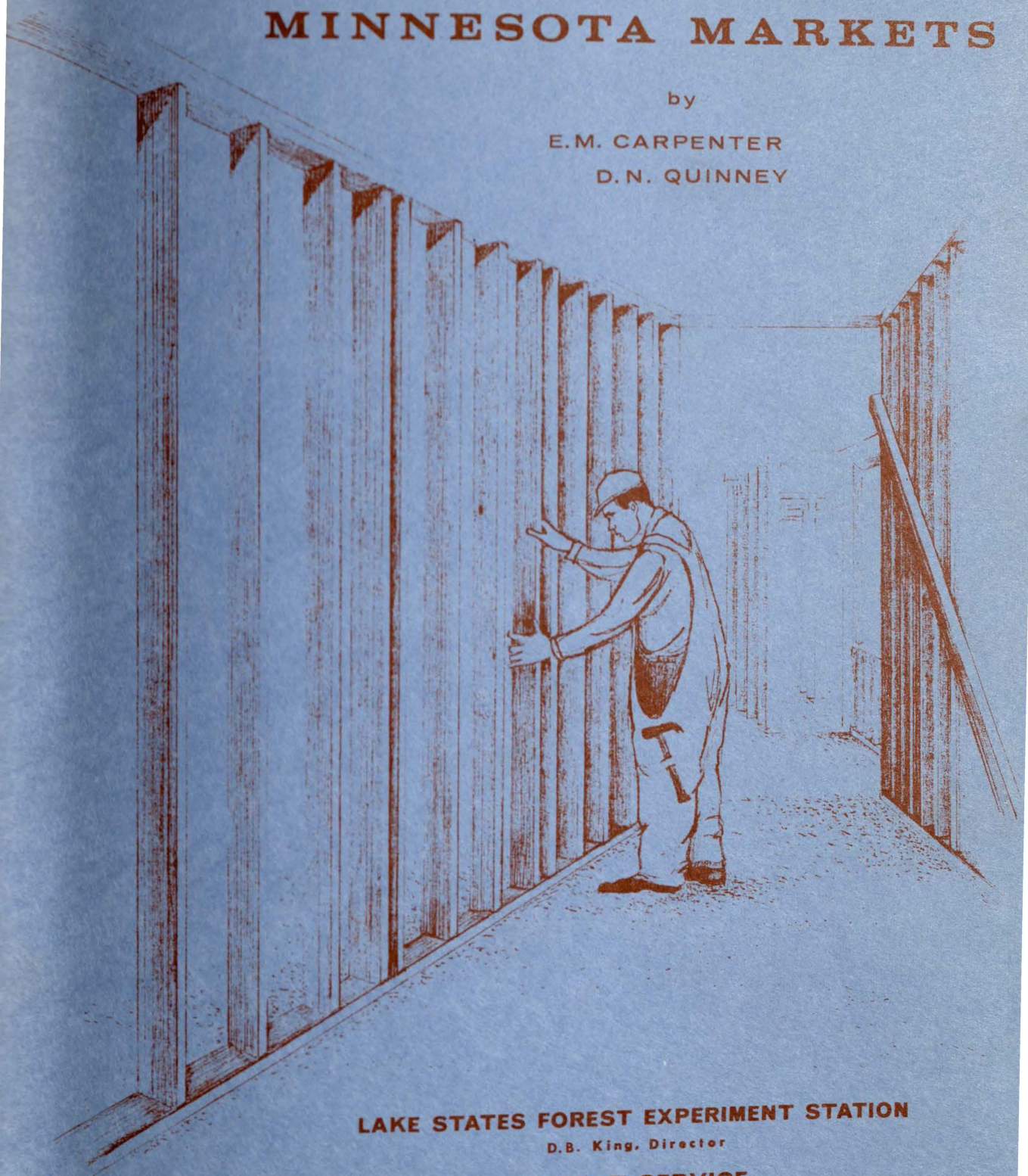
INTERMOUNTAIN STATION
Central Reference File
No. R-23

U. S. FOREST SERVICE
RESEARCH PAPER LS-21
OCTOBER 1965

BALSAM FIR DIMENSION LUMBER IN SELECTED MINNESOTA MARKETS

by

E.M. CARPENTER
D.N. QUINNEY



LAKE STATES FOREST EXPERIMENT STATION
D.B. King, Director

FOREST SERVICE
U. S. DEPARTMENT OF AGRICULTURE

LIBRARY FILE COPY

CONTENTS

Page

INTRODUCTION 1

BALSAM FIR — SUPPLY, DEMAND, PROPERTIES 1

THE STUDY 4

USE AND KNOWLEDGE OF BALSAM FIR 5

- Present Use as Dimension Lumber 5
- Type and Volume of Material Used 5
- Source of Material 5
- Buyers' Uses and Satisfaction 5
- Marketing Problems 6

POTENTIAL MARKET FOR BALSAM FIR 7

- Volume of Other Species Sold 7
- Grade and Price of Balsam Fir 8
- Ways to Increase Use of Balsam Fir 9
- Competitive Production Methods 11

SUMMARY AND CONCLUSIONS 12

Balsam Fir Dimension Lumber In Selected Minnesota Markets

by

E. M. Carpenter and D. N. Quinney

INTRODUCTION

In 1964 the Lake States Forest Experiment Station explored the use and acceptance of balsam fir dimension lumber in two Minnesota market areas. The reasons for making the study were several: Although large supplies of balsam fir are available in the Lake States, it is a much under-used species. Furthermore, its greatest use has been as pulpwood, but its share in the pulpwood harvest has been declining. Obviously, other markets are needed for balsam fir. That forest and mill owners are aware of this is indicated by several inquiries directed to the Station on market possibilities.

This report presents the results of the study and suggests that there may be opportunities for increased marketing of balsam fir as 2x4 dimension lumber.

BALSAM FIR — SUPPLY, DEMAND, PROPERTIES

The spruce-balsam fir type covers slightly more than 4 million acres in the Lake States. This represents a little less than 8 percent of the commercial forest area. In terms of volume, balsam fir totals almost 12 million cords — about 14 percent of the softwood and 3.5 percent of the total timber volume (fig. 1). Balsam fir, however, is a problem species with respect to utilization and marketing.

An estimated 95 percent of the balsam fir harvested is cut for pulpwood. Over the last 15 years this cut has fluctuated considerably, but over time it has shown a slight decreasing trend (table 1).

During this time the total Lake States production of pulpwood jumped from 693,000 cords in 1946 to 3,628,000 cords in 1964 — an increase of nearly 525 percent. The failure of the balsam fir pulpwood harvest to show increases was not due to a declining resource; on the contrary, inventory data show that the volume of merchantable-size balsam fir has increased considerably over the last several decades. The primary cause probably is changes in technology, which have permitted a greater use of aspen and other hardwoods in various pulping processes. Supplies of

TABLE 1. — *Production of balsam fir for pulpwood in the Lake States, 1946-1964*
(In thousands of cords)

Year	Total production	Year	Total production
1946	257.6	1956	304.1
1947	311.6	1957	379.9
1948	400.8	1958	293.6
1949	319.4	1959	291.6
1950	318.0	1960	330.6
1951	347.9	1961	285.9
1952	391.5	1962	260.0
1953	248.3	1963	283.6
1954	311.4	1964	232.4
1955	289.4		

Source: The annual reports on pulpwood production in the Lake States published by the Lake States Forest Experiment Station, St. Paul, Minn.

Note: The authors, E. M. Carpenter, Associate Market Analyst, and D. N. Quinney, Principal Economist, are headquartered at the Station's field office in Duluth, which is maintained in cooperation with the University of Minnesota Duluth.

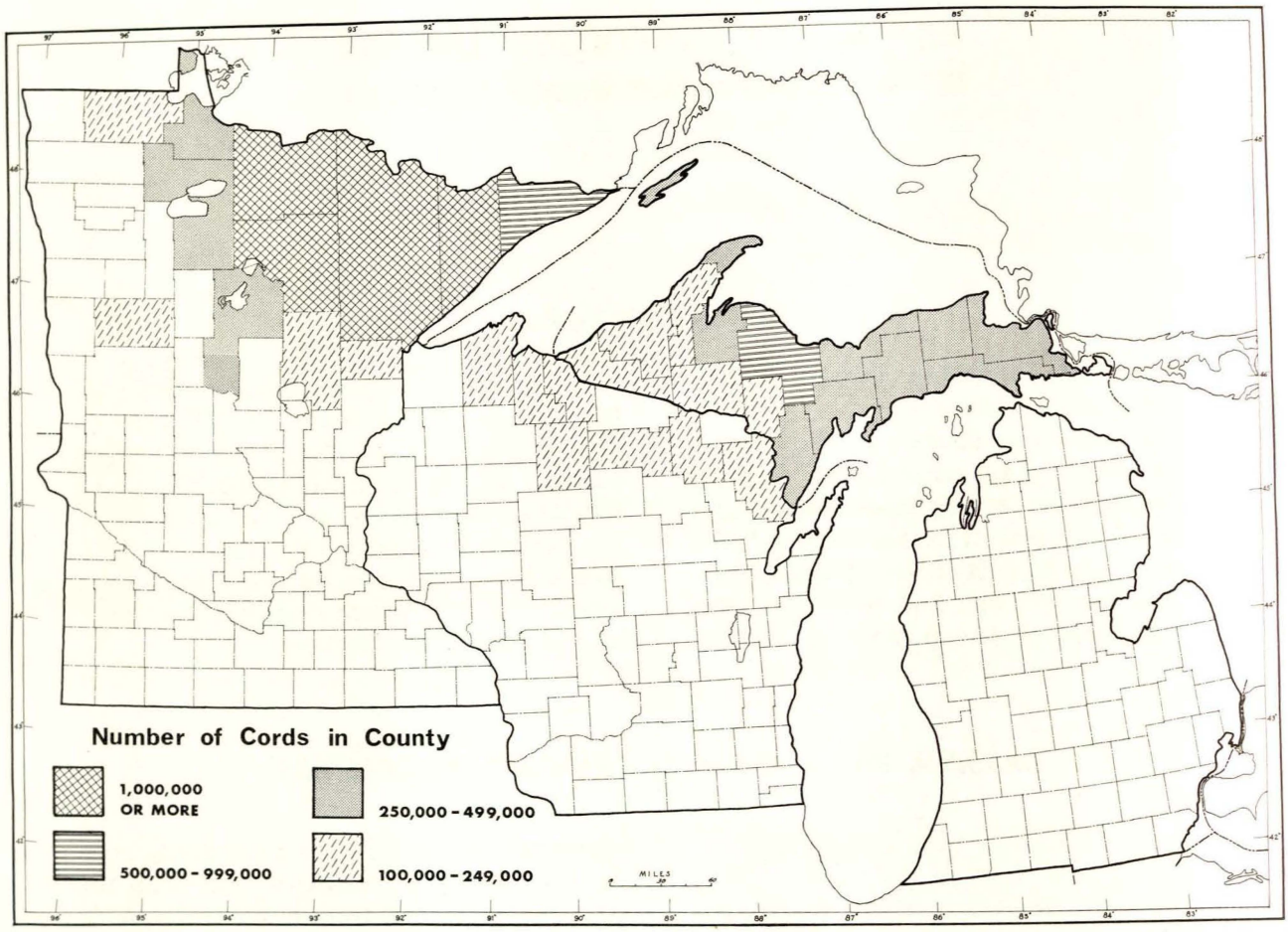


FIGURE 1. — Cordwood volume of balsam fir growing stock in the Lake States. Northeastern Minnesota and Michigan's Upper Peninsula have heavy concentrations of balsam fir timber. Data were obtained from county forest resource reports published for Wisconsin between 1955 and 1958 by the Wisconsin Conservation Department, for Michigan between 1948 and 1957 by the Michigan Department of Conservation, and for Minnesota between 1960 and 1962 by the Office of Iron Range Resources and Rehabilitation. Data were collected and reports published in cooperation with the Lake States Forest Experiment Station.

these species are nearer many of the pulpmills than are balsam fir supplies. Also working against an increased use of balsam fir in the Lake States pulp and paper industry is its low density in relation to unit volume. Balsam fir pulpwood yields less cellulose per unit volume and, under present cost conditions, per unit value than do the spruces or jack pine.[1]

In northern Minnesota especially, balsam fir is an under-used species. Comparisons of timber cut figures for 1953 and 1960 show that the cut of balsam fir growing stock declined by almost 20 percent, in spite of increasing volumes of available fir timber. For this northern area the latest Minnesota Forest Survey figures show that balsam fir timber volume jumped from 5,510,000 cords in 1953 to 8,917,000 cords in 1962, a 62-percent increase. The survey also revealed that in northeastern Minnesota the number of 2- and 4-inch fir trees exceed the number of aspen trees in the same size classes. In the aspen forest type, which covers 1,950,400 acres, balsam fir ranks third in volume (932,000

[1] *U.S. Forest Service. Feasibility of using Lake States hardwoods for newsprint and other pulp and paper products. 84 pages, illus., 1959.*

cords) behind aspen (11,974,000 cords) and paper birch (1,051,000 cords). All other species are far below these figures in this type. Increased markets would give loggers a chance to profitably remove this material from these mixed stands.

Aggravating this problem of under-use are the volumes of balsam fir which might be salvaged from decadent overmature stands. Being a relatively short-lived tree, balsam fir does not "store on the stump." By the time a log-size of 10 inches is attained, many fir stands are showing signs of deterioration, with rot and ring shake taking a heavy toll in the saw log size trees.[2] The salvage of this material would not only help prevent a waste but also provide the management measures necessary to guard against further insect infestation by offering an opportunity for orderly harvest of these stands.

In addition to its use for pulpwood, some balsam fir is manufactured into lumber and dimension stock. In 1961 northern Minnesota sawmills sawed a little more than 4 million board feet of balsam fir.This material is produced in relatively small amounts by many small and medium-size mills. Seldom do the larger mills saw any significant amount on their headrigs; they may purchase a smaller mill's output, rough green or rough dry, for further finishing and marketing by their own organization.

Balsam fir, even when mature, is a small- to medium-size tree, averaging 40 to 60 feet tall and 12 to 18 inches d.b.h.[3] Further aggravating this size problem is the fact that, in the Lake States, average stands are much smaller than this; more usual are trees of 8 to 10 inches d.b.h. and 45 to 55 feet tall (fig. 2).[4] Thus the sizes of material that could be manufactured are limited. In the Lake States,

[2] *Kaufert, Frank H. Heart rot of balsam fir in the Lake States, with special reference to forest management. Univ. Minn. Agr. Expt. Sta. Tech. Bul. 110, 27 pp. 1935.*

[3] *Harlow, W. M., and Harrar, E. S. Textbook of dendrology. 4th ed., 561 pp. New York: McGraw-Hill Book Co. 1958.*

[4] *Roe, Eugene I. Balsam fir in Minnesota — a summary of present knowledge. U.S. Forest Serv., Lake States Forest Expt. Sta. Misc. Rpt. 13, 25 pp. 1950. St. Paul, Minn.*

F-512797

FIGURE 2. — Much of the balsam fir suitable for studs would come from poletimber stands. The logs being loaded here have a minimum 5-inch top, and run heavily to 6- and 8-inch sizes.

most of the second-growth balsam fir stands in 1953 were in poletimber or small-sawtimber tree sizes as shown below.

D.b.h. class (inches)	*Million cords*	*Percent of total*
5.0 — 6.9	4.7	40
7.0 — 8.9	3.8	32
9.0 — 10.9	2.1	18
11.0 — and larger	1.2	10
All size classes	11.8	100

Source: Cunningham, R. N., and Survey Staff. Lake States timber resources. U.S. Forest Serv. Lake States Forest Expt. Sta., Sta. Paper 37, 31 pp. 1956.

In terms of physical characteristics, balsam fir wood is rated as light in weight, low in bending and compression strength, moderately limber, soft, and low in ability to resist shock. It shrinks only moderately in drying, is not difficult to season, and is not likely to split in the nailing process, but is said to be

low in nail-holding ability.[5] [6] In the last respect, it is rated the same as western white fir, spruce, lodgepole pine, and eastern hemlock. Balsam fir lumber of suitable grade is usable in house construction, and standards for such use are provided in the Property Standards of the Federal Housing Administration.

THE STUDY

Because both the wholesale and retail seller of lumber are major determinants in the choice of wood species, the study was aimed at these market functionaries. It included canvassing retail and wholesale merchants, both in the 16-county area commonly referred to as the northern forested region of Minnesota and in the Minneapolis-St. Paul metropolitan area (fig. 3). The two areas were chosen because of the possibility of revealing contrasts in the use of balsam fir between the northern areas, where direct mill-to-yard marketing relationships are common, and the more complex supply channels of the metropolitan market.

A list was assembled comprising 102 retail and 20 wholesale firms in the northern area, and 98 and 66 firms, respectively, in the Twin Cities area. A 25-percent sampling of firms was made in each category in each area. An interview schedule was prepared, and the owner, manager, or other responsible official for each firm in the sample, was personally interviewed in the fall of 1964.

The objectives of the study were to determine:

1. The volumes of balsam fir dimension stock handled by wholesale and retail sellers in northern Minnesota and the Twin Cities in 1963.

2. The sources and prices of this material, the purposes for which it was sold, and apparent buyer satisfaction with the product.

3. The degree of sellers' familiarity with the physical properties of balsam fir; their opinions as to its suitability as dimension lumber; and whether poor or insufficient information on the species' physical properties and performance is hindering its use.

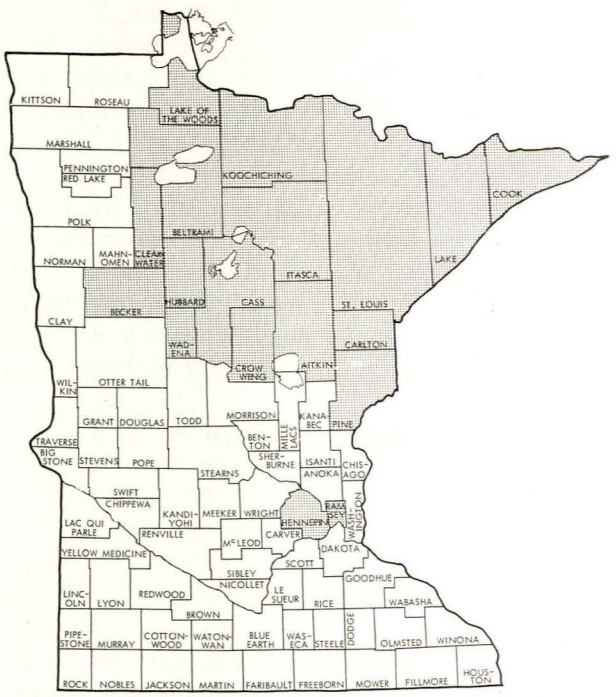


FIGURE 3. — Wholesale and retail lumber yards were sampled in the Twin Cities area and in 16 northern Minnesota counties.

[5] *U.S. Forest Service. Wood handbook. U.S. Dept. Agr. Handbook 72. 528 pp. 1955.*

[6] *Betts, H. S., et al. Balsam fir. American Wood Series, U.S. Forest Serv. 8 pp. 1945.*

Present Use as Dimension Lumber

A substantial difference exists between Minneapolis-St. Paul and northern Minnesota retail lumber yards in the sale of balsam fir as construction dimension lumber. In the northern area, where most yards obtain at least a portion of their lumber from nearby sawmills or directly from their own mills, survey sample figures show that over 75 percent handle balsam fir (19 out of 25 yards sampled), while in the Twin Cities area the proportion is only 8 percent (2 out of 25 yards).

None of the sampled Twin Cities lumber wholesalers handled balsam fir. Of course, none of these dealers were connected with Lake States sawmills, their primary function being that of a wholesale yard or broker. A few were direct sales outlets for western sawmills.

In northern Minnesota, of five wholesalers interviewed who handle dimension lumber, two carry balsam fir. Both of these operate their own sawmills. Two of the three who did not handle balsam fir were brokers who catered principally to industrial accounts and had no market for this type of material. One, a sawmill, is primarily a northern hardwood producer.

Type and Volume of Material Used

The two metropolitan retail yards in the sample using balsam fir in 1963 reported that their 108,000 board feet were purchased air-dried planed, about half in 2x4's and half in 2x6's. In the northern area, of a total 590,000 board feet retailed in 1963, 445,000 feet were purchased air-dried planed, 30,000 feet kiln-dried planed, and approximately 100,000 feet air-dried rough, with planing done by the retail yard. Of the 590,000 feet, 530,000 were accounted for by studs, 45,000 by other 2x4's, and 15,000 by 2x6's.

Source of Material

In the Twin Cities area, of the two retail lumber dealers sampled who used balsam fir in 1963, one obtained his supply from another yard in a special sale, and the other got his through a lumber broker.

Of the 19 retail yards sampled in the northern area that handle balsam fir, 14 dealt directly with independent sawmills, 3 used their own sawmill production, 1 bought from a contract sawmill, and 1 from a broker. The marketing channel most commonly used in northern Minnesota — direct sawmill purchase — undoubtedly developed because of the nearness of yards to mills.

Buyers' Uses and Satisfaction

Because of the small amount of balsam fir marketed in the Twin Cities area, it was impossible to determine a predominant end use, although it was surprising to find a fair portion of the volume marketed as 2x6's. Naturally, tree size dictates the maximum size of material that can be sawn, and only a very minor amount is cut wider than 4 inches. From the sales figures related by northern Minnesota respondents the most common use there is as studs in frame buildings, and most of these are used in residential construction (fig. 4).

Satisfaction and acceptance of balsam fir by the northern Minnesota firms surveyed was high, and no particular marketing problems were found. All firms reported that their customers seemed to accept the species well, with satisfaction running from an actual preference for balsam fir to a simple "no complaints" statement. One of the main reasons given for acceptance was that balsam fir stayed straight in use.

Only one northern yard reported it had stopped handling the species, and this only because no competitive supplier was available. One northern wholesaler reported quan-

tity sales to a project builder in the Minneapolis area, who was well satisfied.

In the Twin Cities area, two retail yards currently handle balsam fir and two had handled it in the past. Three of the four reported good customer satisfaction. One ceased carrying it because he could not find a reliable supplier at a competitive price. The fourth stopped using balsam fir because he felt that its nail-holding ability was insufficient for scaffolding construction where nails may not be driven flush, and also that heavy garage doors could not be nailed directly to the studs.

The first two data columns in the tabulation below show the number of yards reporting various uses of balsam fir in 1963. The third column shows the number of yards not now handling balsam fir but who think it may have potential uses for their customers.

	Present		*Potential*
Use	*Northern Minnesota*	*Twin Cities*	*Twin Cities*
Residential construction	18	—	12
Commercial construction	2	—	—
Cabins	2	—	—
Garages	2	2	4
Basement rooms	—	2	3
Do-it-yourself projects	8	2	4
Project builders	—	—	1

Obviously there is some overlapping of categories. "Do-it-yourself" probably would often include basement rooms and garages. Also, yards that sold balsam fir dimension stock for residential construction probably sold some for other uses.

The number of yards that sell or expect to sell balsam fir to various types of customers is shown below:

	Yards selling to—		
	Contractors	*Do-it-yourself*	*Project builders*
At present:			
Northern area	19	8	—
Twin Cities	—	2	—
Potential:			
Northern area	3	4	—
Twin Cities	12	8	1

None of the Twin Cities wholesalers presently handle balsam fir. Of the 10 wholesale firms interviewed who handle construction

F-512798

FIGURE 4. — Studs usually account for 15 to 20 percent of the volume of lumber used in house construction.

dimension lumber, 7 said they would be interested in stocking local fir, 1 said he possibly would, and 2 said they would not. One of the firms who expressed negative interest felt that the production of local dimension lumber is too uncertain both from a quantity and quality standpoint. The other "noninterested" firm did not sell studs.

Of the five wholesalers in the survey in northern Minnesota who handled dimension lumber, two carried balsam fir. The other three either did not sell studs, had no customer who used studs, or thought that they could not procure and market it at a competitive price.

Marketing Problems

In both areas, some merchants thought that a wider use might be achieved if producers could supply well-manufactured studs at a more competitive price. Production inefficiency seems reflected in selling prices ranging in the high $80's and low $90's. It is often possible for western woods to compete in this price range in northern Minnesota. Another marketing problem is size of

product; balsam fir is usually sawn into 8-foot, 2x4 studs. Some longer lengths are produced, but very little wider material is sawn. This means a yard must depend on other woods, such as red pine, jack pine, or western species, to provide this wider dimension lumber.

The Twin Cities area may be termed a Douglas-fir market, and some yards handle this species exclusively. Other species found in this market are western white fir,[7] western hemlock, white spruce, larch, lodgepole pine, and cedar. Yards generally carry Douglas-fir in the 2x8 and greater widths and another species, particularly white fir, in the 2x4 and 2x6 widths. Some yards carry Douglas-fir in all widths, with a portion of 2x4 studs supplied by white fir, lodgepole pine, or one of the other species. The latter marketing pattern is a recent trend, coincident with the development of numerous specialized stud mills in the West. Thus it would seem that, although balsam fir could not compete in the 2x6 and larger sizes, opportunities exist for balsam fir in this specialty stud market.

Balsam fir is sometimes sold mixed with other species. The associated spruce tends to twist when not properly dried or stored; because of this, some dealers had formed the belief that fir does the same. Nevertheless, misinformation did not seem to limit the present use of local fir. Small production, lack of reliable suppliers, and high price are probably the primary reasons for low use. The relatively poor quality of manufacture (whether real or imagined) generally associated with local lumber by many metropolitan dealers makes it difficult for the better suppliers to operate in the market. A specialty manufacturer of balsam fir 2x4's would be faced with this problem; and extra promotion plus a consistent supply of well-manufactured material would be necessary to obtain and hold a share of the market.

POTENTIAL MARKET FOR BALSAM FIR

Volume of Other Species Sold

Yards in both northern Minnesota and the Twin Cities generally carry western species — the exception being northern yards that sell only their own mill's output. The metropolitan market, with its high volume requirements, is dependent on western production — local production is not nearly sufficient to satisfy the need. Also, since the bulk of the lumber is sold through large wholesalers, metropolitan marketing channels tend to favor western producers. Price, sustained offerings, reliable grading, and consistent drying and finishing are also important factors in supplying this market. Northern yards also use more western than local lumber, even though the majority handle local species. Size requirements are part of the reason for this, but price and volume are also important.

Since this was an exploratory study, no attempt was made to establish precisely the volumes sold by individual yards. We did try to obtain general volume figures for balsam fir and the several western species in the two market areas. Because some sellers could not estimate volume used by species and width, or even the total volume sold in the study areas, the figures are not complete, but they give a general idea of the relative volumes of various species sold. Both in the Twin Cities and northern Minnesota, western species constituted the great majority of the material handled (table 2).

While large volumes of Douglas-fir were handled by most dealers, the bulk of the comparatively large volumes of white spruce and western hemlock were reported by only a few yards specializing in one of these species. Of the retail yards in the Twin Cities reporting volume used by species, the following tabulation shows the number handling each species:

[7] *Western white fir as used here refers to all of the western true firs collectively, as they are commonly designated by the trade.*

TABLE 2. — *Distribution of species handled by retail yards in the Twin Cities and northern Minnesota, 1963*[1]
(Thousand board feet)

Species	Twin Cities		Northern Minnesota	
	All dimension	2x4	All dimension	2x4
Western:				
Douglas-fir	33,532	8,236	1,506	30
White fir	640	429	1,956	1,232
White spruce	2,550	900	135	34
Hemlock	2,355	225	445	50
Fir and larch	1,050	700	—	—
Cedar	105	80	—	—
Lodgepole pine	1,855	1,785	35	—
Total	42,087	12,355	4,077	1,346
Local:				
Jack pine	—	—	210	110
Red pine	—	—	767	25
Balsam fir	110	60	590	575
Total	110	60	1,567	710
All species	42,197	12,415	5,644	2,056

[1] *Includes only those surveyed firms who could provide data.*

Species	*No of Yards*[1]
Douglas-fir	23
Western white fir	8
Lodgepole pine	6
Western hemlock	5
Western white spruce	3
Balsam fir	2
Western fir and larch	1
Western cedar	1

[1] *This tabulation includes alternates to the 25 yards in the original survey, or a total of 27 yards.*

Nearly all the lodgepole pine was marketed as 2x4's, as was approximately two-thirds of the white fir, fir and larch, and cedar. For Douglas-fir, white spruce, and hemlock, several respondents could only estimate total volume used by species and not by size of material. Thus comparison of the percentage marketed as 2x4's is not possible for these species.

Grade and Price of Balsam Fir

Grade rules are published by several associations (fig. 5). The commonly used dimension lumber grades are Construction, Standard, and Utility for western species; and No. 1, No. 2, and No. 3 for local lumber. Western stocks are often sold in the following combinations: Construction (25% standard), sometimes called Standard and Better; and Construction (25% standard) (10-15% utility), sometimes called Utility and Better. Utility is also sold unmixed. Local dimension is often sold as No. 2 and Better or in some cases, log run or ungraded. As a generalization, the western Construction grade is similar to local Grade No. 1, Standard to No. 2, and Utility to No. 3.

It is difficult to compare prices for western and local grades. Actually average quality for mills using the same rules may differ considerably, particularly in mixed-grade shipments. In addition, some mills supply special grade mixes to certain yards, with the actual mix depending on the price paid.

Table 3 shows price ranges developed during the course of the study. These represent delivered prices to the lumber yards for 2x4's, and hold for both study areas. Prices may tend toward the higher end for western stock in the northern area. Price differences develop because of the wide variety of length

TABLE 3. — *Price ranges paid per thousand board feet for 2x4 dimension lumber by species for firms surveyed in the Twin Cities and northern Minnesota, 1964*
(In dollars)

Species	Grades		
	Utility	Utility and Better	Standard and Better
Douglas-fir	High 60's	Low to mid 80's	High 80's to mid 100's
Fir and larch	Mid to high 60's	Low 80's	High 80's to high 90's
Western hemlock	Mid 60's to low 70's	Low 80's	Mid 80's to low 90's
Western spruce	Low 70's	High 70's to low 80's	Mid 80's
Western white fir	Mid to high 60's	High 70's to mid 80's	Mid 80's to low 90's
Lodgepole pine	Mid 60's	Mid to high 70's	High 70's to low 80's
Balsam fir		No. 3 and better	No. 2 and better
		Mid 60's to mid 70's	Mid 80's to low 90's

combinations in individual shipments, plus other variations such as end waxing, grade marking, and end-branding. Two-by-fours generally bring a lower price per thousand than other widths.

Even though the table indicates comparable price ranges for balsam fir and western white fir, the bulk of the balsam was sold in the low $90's and the western white fir in the mid $80's.

F-512799

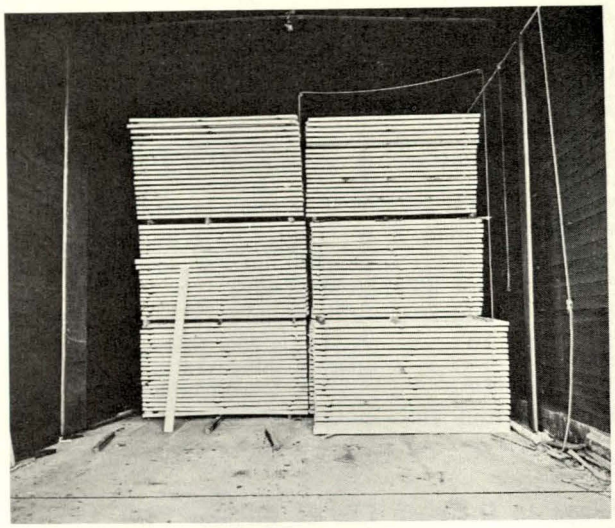
FIGURE 5. — Grading and grade marking are essential to the successful marketing of construction dimension lumber. FHA regulations require grade marking by agents of an authorized grading association.

Ways to Increase Use of Balsam Fir

Each respondent was asked whether he would be interested in handling balsam fir and how he thought its use might be increased in the dimension lumber market. Many of them expressed an interest provided that certain requirements were met. In general, these requirements were that the product must be kiln-dried, be competitive in price with western species, have a good appearance, and be readily available for repeat orders.

In both market areas, dryness and price were most often mentioned. Significant differences exist between the northern and metropolitan areas as far as dryness is concerned. Northern yards recognized its importance, but several indicated *well*-air-dried material would be satisfactory. In the Twin Cities, most indicated that they would not handle lumber unless it had been kiln-dried. Many of these yards store their stock unprotected in the open or in open-sided sheds, where at least some wetting might occur. Thus, some firms apparently place great emphasis on handling kiln-dried lumber, but actually store it under conditions where moisture content may not be much lower than in air-dried material. In any event, kiln drying would seem to be a requisite to expanding sales in the metropolitan market (fig. 6).

With reference to price some dealers suggested that in order to enter the market, balsam fir would have to be from $5 to $15 per thousand board feet below western species.



F-512800

FIGURE 6. — Kiln drying is required to market lumber in the large metropolitan market.

F-512802

FIGURE 7. — Do-it-yourself customers often purchase lumber on appearance characteristics. Balsam fir studs with light color, straight grain, and small tight knots present an attractive appearance to the retail customer.

However, most thought a competitive price would be sufficient, provided quality, appearance, and availability were comparable to western species with similar characteristics, such as western white fir, western hemlock, western spruce, or lodgepole pine. Table 4 shows the price or price ranges various retail yards thought necessary to interest them in carrying local fir.

These survey figures indicate that there are two strong price ranges — $65 to $75 and $75 to $85 — and that the northern area is willing to pay a slightly higher price, on the average, than the more competitive metropolitan area.

Appearance, the third most important factor mentioned, was especially stressed in the metropolitan area. Balsam fir's light color, straight grain, and small sound knots are features which enhance salability. Many sellers in the Twin Cities said that balsam fir should have good acceptance by the expanded "do-it-yourself" or so-called "walk-in" trade. For this market, lumber is more often sold on looks than other characteristics (fig. 7). These buyers require that the lumber be well-machined, smooth, free of bark, with rounded corners (eased edges), trimmed to an exact length, and grade stamped. Other appearance features often influencing customers are end waxing or painting, and trade-name branding. Most of these features are considered highly desirable, if not essential, by retail yards in the metropolitan area.

TABLE 4. — *Purchase price ranges at which retail yards might be interested in handling balsam fir dimension lumber, 1964*
(Number of yards)

Price (dollars)	Twin Cities			Northern Minnesota		
	Grade not specified	Utility type	Standard type	Grade not specified	Utility type	Standard type
Less than $55	—	2	—	—	—	—
$55 - 65	—	3	—	1	—	—
$65 - 75	7	2	—	7	2	—
$75 - 85	6	—	1	7	—	—
More than $85	—	—	—	1	—	—

The fourth factor cited was reliability of supply. Once their customers have accepted the species, yards must be assured of a full-time, dependable supply and be able to obtain material consistently manufactured and graded whenever it is needed. This includes prompt delivery of orders within the time specified. Even though this was not mentioned as often, it is undoubtedly of great importance. Considering the proximity of the production area to the market, reliability of supply should be developed as a strong point for increasing the use of balsam fir.

These four factors — dryness, price, appearance, and availability — were by far the most commonly mentioned. Others cited were: (1) that a variety of lengths should be available in addition to studs, and (2) that stock should be palleted and packaged (wrapped) for easy handling and storage. A few dealers said they would be interested in handling balsam fir if it became accepted by the trade. Thus, one difficulty might be to find enough dealers in the metropolitan area to pioneer the use of local fir.

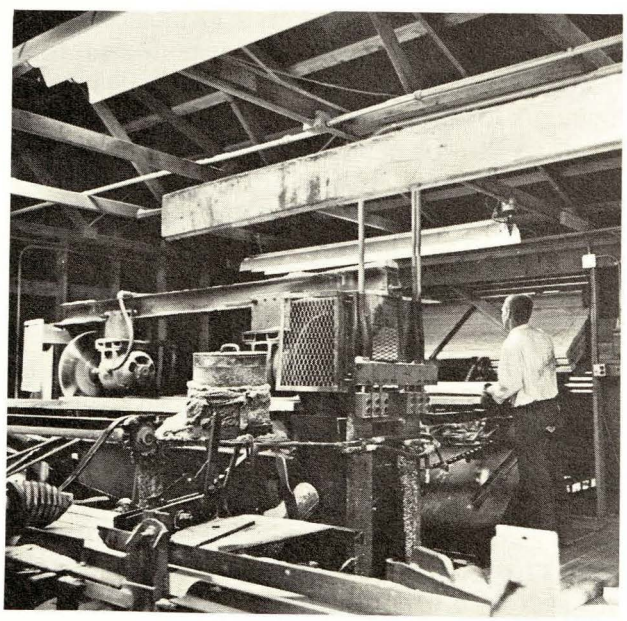
Even though few Twin Cities dealers were familiar with the physical and mechanical properties of balsam fir, the survey revealed a large majority interested in handling local fir. Thus it appears that there is a market potential. Most of the few who showed no interest were firms who sell only one mill's output (often their own) or do not wish to handle more than one species (usually Douglas-fir).

It should be understood that balsam fir is competing for the standard and better uses and it should not be thought of as only a "utility" grade product, both from a quality and price standpoint. It is widely used by contractors in the northern area for light frame construction.

Competitive Production Methods

To maintain a position in the market and to justify undertaking essential marketing techniques, any stud-mill installation would have to be of sufficient scale to assure the handling of repeat orders promptly with a standardized product. Because of the efficiency of western stud mills, a local producer would probably have to have a comparable installation to hold production costs to a minimum. This might be achieved by using a highly automated sawmill of special design, such as the very efficient scrag or twin-circle mills, now so common in the West and in Canada. In addition, a market for slabs, edgings, and other residue from the production processes may be needed; possible products are pulpmill chips, kiln or industrial fuel, and litter.

Recently a specialized stud mill sawing balsam fir has been established in northwestern Wisconsin (fig. 8). This mill produces studs on a twin-circle headrig; they are then kiln-dried, finished, end painted, graded, trademarked, and packaged. The finished product is marketed in midwestern metropolitan areas as "northern white fir." The average log size used by this mill is necessarily smaller than that used in the West. Specialty mills of this type in Canada sawing material similar in size to that found in the northern Lake States are producing 20 to 30 thousand board feet per shift.



F-512801

FIGURE 8. — This mill, specializing in balsam fir studs, features a twin-circle scrag mill, kiln drying, and precision end-trimming. Residue from the production processes is chipped for pulpmill consumption.

Another possible production unit is one that makes cants for subsequent resawing by chipping the surfaces of the logs, thus producing chips instead of slabs. This reduces waste by eliminating much of the sawdust produced by conventional sawing methods.

One advantage that local producers have over western sources is the substantially lower freight rates to the Twin Cities and other midwestern markets such as Milwaukee and Chicago. Another is the possibility of serving these markets, particularly Minneapolis-St. Paul, with truckload lots. This could be important to some retail outlets because of the lower investment required to stock their yards. Certainly the quicker delivery times from local producers would be very desirable.

As discussed previously, the following techniques are thought to be necessary to make balsam fir studs widely acceptable in mid-western metropolitan markets: kiln drying, precision end-trimming (PET), eased-edge (EE), end waxing or painting, grade stamping, and branding with a trade name.

Grading and grade stamping are essential. Federal Housing Administration regulations require that lumber used under their jurisdiction must be grade stamped under rules of an accredited association, such as the Northern Hardwood and Pine Manufacturers Association, Green Bay, Wis., or the Western Wood Products Association, Portland, Ore. If the material is to compete in metropolitan markets compliance with FHA regulations would appear to be an absolute necessity.

SUMMARY AND CONCLUSIONS

In this survey of present and potential markets for balsam fir dimension lumber with 65 wholesale and retail Minnesota lumber yards in the sample, it was found that firms in the metropolitan Twin Cities area had had little experience in buying and selling local fir. In contrast, in northern Minnesota, a majority of the firms surveyed did handle such material. Of firms that sold balsam dimension lumber, satisfaction (as reflected by their customer purchases and "feed-back") was high.

Many retail firms (not now selling the material) expressed an interest in handling it. Of high importance was the price at which it could be procured. Price ranges varied, but $65 to $85 per MBF in the "Utility and Better" or "Standard and Better" grades were most frequently cited by retail firms as the purchase price range at which they might be interested. Probably because of discounts obtained due to large volume purchases of western species, the Twin Cities firms cited a slightly lower necessary supply price than did the northern small-town yards.

In addition to a delivered price competitive with western species, three other factors were most frequently cited as being important if markets for local fir are to be expanded. They were: (1) dryness, (2) appearance, and (3) reliable and continuous supply. Dryness was a more critical factor to Twin Cities firms than to northern firms where *well* seasoned, air-dried material seemed to be acceptable to many of the firms surveyed.

These findings suggest that there may be opportunities for increased marketing of balsam fir as 2x4 dimension lumber. There did not appear to be strong reservations against the suitability of the species for this product use, *if* price, manufacturing requirements (including kiln drying), and dependability of supply would be assured.

To meet these requirements, it would seem that producers must follow specialized and efficient manufacturing methods such as those used by western producers. Such facilities generally consist of highly mechanized sawmills of special design, such as scrag or

small twin-circle mills. In addition, kiln drying and prompt deliveries apparently would be requisites for successfully marketing the material produced.

Although efficient facilities are needed to keep product cost competitive, the scale of mill size and capital investment would have to be guided by the availability of raw material supplies in a particular area. One such specialized mill is now operating in northwestern Wisconsin (with log supplies obtained by truck from nearby northern Minnesota); and it is possible that several other northern Lake States locations may offer similar manufacturing opportunities.

Many phases of production, such as logging costs; cull percents; sawing, milling, and drying costs; amount of degrade; and ease of kiln drying, are not well known and need to be documented for Lake States conditions. Ignoring these for the moment, production of dimension lumber appears to offer an opportunity to put to practical and economic use our increasing volumes of small balsam fir sawtimber.

SOME RECENT RESEARCH PAPERS IN THE LAKE STATES STATION SERIES

Direct Seeding of Conifers in the Lake States: A Review of Past Trials, by Eugene I. Roe. U.S. Forest Serv. Res. Paper LS-3, 16 pp., illus. 1963.

Cutting Methods in Mixed Conifer Swamps, Upper Michigan, by John W. Benzie. U.S. Forest Serv. Res. Paper LS-4, 24 pp., illus. 1963.

Water Yield and Soil Loss From Soil-Block Lysimeters Planted to Small Trees and Other Crops, Southwestern Wisconsin, by Richard S. Sartz. U.S. Forest Serv. Res. Paper LS-6, 23 pp., illus. 1963.

Seeding and Planting Tests of Northern Red Oak in Wisconsin, by Harold F. Scholz. U.S. Forest Serv. Res. Paper LS-7, 7 pp., illus. 1964.

Recreational Use of the Quetico-Superior Area, by Robert C. Lucas. U.S. Forest Serv. Res. Paper LS-8, 50 pp., illus. 1964.

Forest Owners and Timber Management in Michigan, by Con H Schallau. U.S. Forest Serv. Res. Paper LS-9, 39 pp., illus. 1964.

The Causes of Maple Blight in the Lake States, by Lake States Forest Experiment Station. U.S. Forest Serv. Res. Paper LS-10, 15 pp., illus. 1964.

Identification of Hardwood Insects by Type of Tree Injury, North Central Region, by H. J. MacAloney and H. G. Ewan. U.S. Forest Serv. Res. Paper LS-11, 70 pp., illus. 1964.

The Identification of Primary Red Pine Cone Insects, by John S. Hard. U.S. Forest Serv. Res. Paper LS-12, 10 pp., illus. 1964.

Guide for Selecting Superior Trees for Shelterbelts in the Prairie Plains, by David H. Dawson and Ralph A. Read. U.S. Forest Serv. Res. Paper LS-13, 22 pp., illus. 1964.

Black Bark as an Indicator of Bird Peck Defect in Sugar Maple, by John H. Ohman and Kenneth J. Kessler, Jr. U.S. Forest Serv. Res. Paper LS-14, 8 pp., illus. 1964.

The Recreational Capacity of the Quetico-Superior Area, by Robert C. Lucas. U.S. Forest Serv. Res. Paper LS-15, 34 pp., illus. 1964.

Sediment, Streamflow, and Land Use Relationships in Northern Lower Michigan, by W. David Striffler. U.S. Forest Serv. Res. Paper LS-16, 12 pp., illus. 1964.

Fragmentation, Absentee Ownership, and Turnover of Forest Land in Northern Lower Michigan, by Con H Schallau. U.S. Forest Serv. Res. Paper LS-17, 12 pp., illus. 1965.

Thinning Red Pine for High Investment Returns, by Allen L. Lundgren. U.S. Forest Serv. Res. Paper LS-18, 20 pp., illus. 1965.

Characteristics of Family Campers Using the Huron-Manistee National Forests, by David A. King, U.S. Forest Serv. Res. Paper LS-19, 11 pp., illus. 1965.

THE FOREST SERVICE CREED

The Forest Service of the U.S. Department of Agriculture is dedicated to the principle of multiple use management of the Nation's forest resources for sustained yields of wood, water, forage, wildlife, and recreation. Through forestry research, cooperation with the States and private forest owners, and management of the National Forests and National Grasslands, it strives — as directed by Congress — to provide increasingly greater service to a growing Nation.